

# Arts in the digital era

## SUMMARY

Arts and technology have always been inter-related. Artistic expression has been facilitated thanks to technological innovation that enabled artists either to adapt technologies meant for other purposes, or to invent them as a way to foster the creative process.

The past 30 years have seen the rapid development and deployment of digital technology, and an ever-increasing use of information and communications technologies for all sorts of needs, including artistic expression. One of the most recent innovations, artificial intelligence, has already found its way into artists' studios and the creative process.

The European Union faces international competition not only with regard to technological progress and art markets but also to the use of new technologies for artistic expression. Therefore, to keep their competitive edge, EU artists need to acquire skills and competences also in high-tech fields, and the research and innovation community needs to keep abreast of evolving developments.

The EU is soon to adopt its financial framework for the next budgetary period (2021-2027) and is discussing the levels of funding for its various support programmes, such as those for research and innovation, for cultural and artistic activities, and for the accomplishment of its digital single market, which among other things allows diverse operators and consumers to meet and interact. The discussions on these funding programmes also touch upon funds for projects on the interaction between arts and technology.



### In this Briefing

- Artists, innovation and technology
  - Digital technology, artificial intelligence and artistic creation
  - Technological and artistic novelty – the European perspective
- EU science, technology and art
  - EU funding for interdisciplinary arts, ICT studies and research
  - European Parliament on the arts and technology nexus

## Artists, innovation and technology

Although arts, technology and science may not at first sight seem to belong together, they do interweave with each other. Creative artistic minds have always been looking for new techniques and ways of mastering the material world as a channel for self-expression. Recent developments in digital technology have influenced arts and culture in many ways. Information and communications technologies have provided artists with tools enabling them to access new modes of self-expression and of linking and interacting with their audience. These tools have revolutionised the perception of arts and creation. Artificial intelligence (AI) too has found its way into various artistic domains.

### Digital technology, artificial intelligence and artistic creation

Digital technology enables today's public to keep informed about cultural events and buy tickets for them. It is increasingly common to read a newspaper or a novel, to listen to music, or to watch a film online. Digitalisation has also provided artists and creative people with new tools and means of expression. For instance, specialised programmes help architects and designers in their work. Artists experiment with photographic and film-making equipment, digital/electronic musical instruments, music composition programs, and likewise use digital technologies to produce visual art, 3D print sculptures and [immersive](#) or interactive works of art.

#### Artificial intelligence as an artist

AI has already produced its own works of art. In 2018, an 18th-century-style portrait of a man, supposedly a Frenchman, generated by an algorithm, was sold at [auction](#). A [novel](#) written according to an algorithm managed to pass the first stage of a literary prize test two years earlier. Attempts at AI-created [screenwriting](#) do not yet seem to pose a challenge to human screenwriters, although the result may still be entertaining.

The first attempts involving the use of [machines/robots](#) to create or to assist in the creation of works of art date back to the 1950s. While AI was originally meant to replace human beings in tedious and repetitive tasks, the public has recently been exposed to AI-composed music, AI-made visual art and AI co-written film scripts or novels. Such uses of AI raise a host of questions about: the nature of the creative process, human nature, the possibilities of AI as a [creative tool](#) and the challenges associated with autonomous creation by AI. It is both a thrilling and a terrifying prospect.

### Technological and artistic novelty – the European perspective

In the 19th century, Europe pushed the borders of art thanks to technological innovation, such as photography, invented in parallel by Daguerre and Nadar (France) and Talbot (England), and film technology, invented by the Lumière brothers (France). A century later, adding sound to film was a technological battle between US and European producers. Currently, albeit a very dynamic creative content supplier, Europe lags behind US technological giants and Asian technology suppliers, who provide costly and sophisticated equipment and digital platforms to artists and their audiences alike. Video games, which are purely digital creations resulting from a collaboration between artists from diverse fields of art – visual arts, music, story-writing, cinematic animation, concept design and voice acting, to name a few – are dominated by EU content producers. Even though video games have not yet been fully recognised as an [art form](#) (just like photography and film in their early days), they have already been the focus of an exhibition – 'Art in Video games' – in 2015 in Paris. In the EU, the value added and turnover of this sector [grew by more than 70 %](#) between 2011 and 2016, and its [market grew](#) by 15 % in 2018.

#### Where art meets technology

An EU supported game, 'The Witcher', is based on a successful Polish fantasy novel. The Polish production studio employed numerous [artists](#) from different artistic fields and gave them creative freedom. The result was a very successful game, of high artistic quality. Due to the popularity of both the game and the novel (the latter having been translated into more than 20 languages), it will be adapted as a TV series. In Poland, the cultural sector grew [almost tenfold](#) between 2010 and 2016.

## EU science, technology and art

Digital technologies in the EU operate within the framework of the [digital single market](#) – the strategy that aims to enhance the EU's position in the digital economy. The digital single market addresses all of the dimensions of the digital economy: infrastructure, research, network technologies, connectivity and access, security issues and digital society, all of which are important for digital art and culture. Culture and media, including copyright, promotion of European works, digitisation of Europe's cultural heritage and protection of minors, are also covered by this strategy.

### EU funding for interdisciplinary arts, ICT studies and research

In order to encourage artists, scientists and ICT specialists to combine their forces and open new artistic and scientific horizons, the EU has devoted €1.5 million from its [Creative Europe](#) programme to an experimental project on an interdisciplinary [Master's degree](#) in arts and science, offering training in arts, ICT, entrepreneurship and business.

Similarly, the [Horizon 2020](#) programme for research and innovation provides funding for research in human sciences addressing [societal challenges](#) and issues such as identities, memories, [tolerance and cultural heritage](#), and cultural cooperation projects. Research in these areas includes technical aspects, such as audiovisual (AV) digital content, data related to cultural heritage and arts, and 3D data gathered by drones and scanners, semantic analysis of artefacts, 3D modelling integrating geospatial information and global and indoor positioning systems, but also 3D printing and representation, virtual reality, augmented reality, AI, laser detection and ranging, interactive and immersive experience, etc. The results of such research can also be used for artistic purposes.

The European Commission explored the interrelation between arts and science back in 2012; this led to a 2015 [study](#) on the links between art and ICT, and the launch of the [S+T+ARTS \(STARTS - science, technology and arts\) project](#), funded from the Horizon 2020 programme. This project aims to push boundaries, generate more inclusive and sustainable innovation and open-minded attitudes, through collaboration between artists, researchers, engineers, society and individuals.

More specifically, the STARTS project fosters cooperation involving scientists and researchers who provide their insights and contribution to the world of artistic expression, and conversely aims to increase the impact of artists in high-tech. It also makes space for artists to provide their views on technological developments and to offer their human-centred vision of the world and technology. The project has four elements: [lighthouses](#), [academies](#), a [prize](#) and [residencies](#).

The lighthouses seek to include arts in the development of innovative research in areas that pose challenges to both industry and society. Examples include innovative designs created to address societal challenges faced by cities as they expand, and an open innovation platform for developing the fashion of the future, which addresses new functionalities as well as the aesthetic and emotional needs of a modern world. The academies are devoted to creating bridges between art and technology at all levels of education; for this purpose, artists and technologists teach digital skills to children and young adults in a playful way. The prize (€40 000, funded by the European Commission), rewards arts-inspired innovation in technology, industry and society that contributes to economic and social innovation. It is featured at the Ars Electronica event in Brussels every year.

The residencies provide 6-12-month stays for artists at technology institutions for the purpose of boosting the innovation potential of any technology. One such residency contributed to the creation of 'Wind Avatar', an artwork shortlisted for the 2019 NTU [Global Digital Art Prize](#) in Singapore. The [Vertigo](#) STARTS platform monitors artists working in 45 residencies, and contributing to tech projects by bringing in a new perspective through their artistic practices. The platform makes original artwork produced during residencies accessible to the public and interested parties.

In one of its recitals, the proposal for a regulation on the next (2021-2027) research and innovation funding programme, [Horizon Europe](#), states that efforts 'to remove barriers and boost synergies between science, technology, culture and the arts to obtain a new quality of sustainable innovation'

are among the objectives of the programme. The proposal for a regulation establishing the [Creative Europe](#) programme (2021-2027) highlights important links between arts and research and innovation in its chapter on the programme's consistency with other EU programmes, such as Horizon Europe, and its potential to strengthen synergies between them. It also envisages the need to build bridges between the arts and industrial and social innovation via the STARTS project.

## European Parliament on the arts and technology nexus

In its March 2019 [resolution](#) on the proposal for a regulation establishing the Creative Europe programme, the European Parliament highlighted that European cultural diversity is rooted in artists' competences and their capability to create, innovate and conduct their own artistic research. It called for the inclusion of arts in education, on a par with science, technology, engineering and mathematics (STEM). The Parliament also stated that it was in favour of the EU's contribution to networking within international communities fostering cross-disciplinary collaboration, including that between artistic and digital skills. To this end, the programme should enhance synergies between arts, culture, science, research and technology. The Parliament voiced its support for the promotion of new artistic practices as a way to strengthen the cultural and creative sectors, while at the same time guaranteeing copyright protection for the innovative approaches applied by artists.

In its [resolution](#) on the Digital Europe programme, the Parliament called for synergies with the Creative Europe programme, particularly via the MEDIA sub-programme, and highlighted that, thanks to such synergies, the Digital Europe programme would give creators access to the latest digital technologies such as AI and advanced computing.

In March 2019, the Parliament adopted a [resolution](#) on the proposal for a directive on copyright in the digital single market, defending authors' and artists' rights to fair remuneration in the digital environment, where their works happen to be pirated. The Parliament's stance in favour of authors and artists was found to be controversial by some groups of users of such content, who thought it would foster censorship on the internet. Adopted in May 2019, Member States now have 24 months to implement the provisions of the [directive](#); in the meantime, new issues have emerged. Concerns about copyrightable works produced by computers or robots, voiced by the Parliament's Committee on Legal Affairs in its 2017 [report](#) with recommendations to the Commission on Civil Law Rules on Robotics, have been echoed in an April 2018 Commission communication on [Artificial Intelligence](#) for Europe, which raised tentative questions about copyright and rights ownership with regard to works created with the use of AI. However, in a 2018 study, [Artificial Intelligence – A European perspective](#), the Commission questions such a possibility and, in the light of the humanist approach to the issue, expresses doubt that AI-generated works are entitled to copyright protection.

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